



Groundwater Sampling for Per- and Polyfluoroalkyl Substances (PFAS)

Former Marine Corps Air Station Tustin, Tustin, CA

Alex Bollweg
Environmental Engineering Support

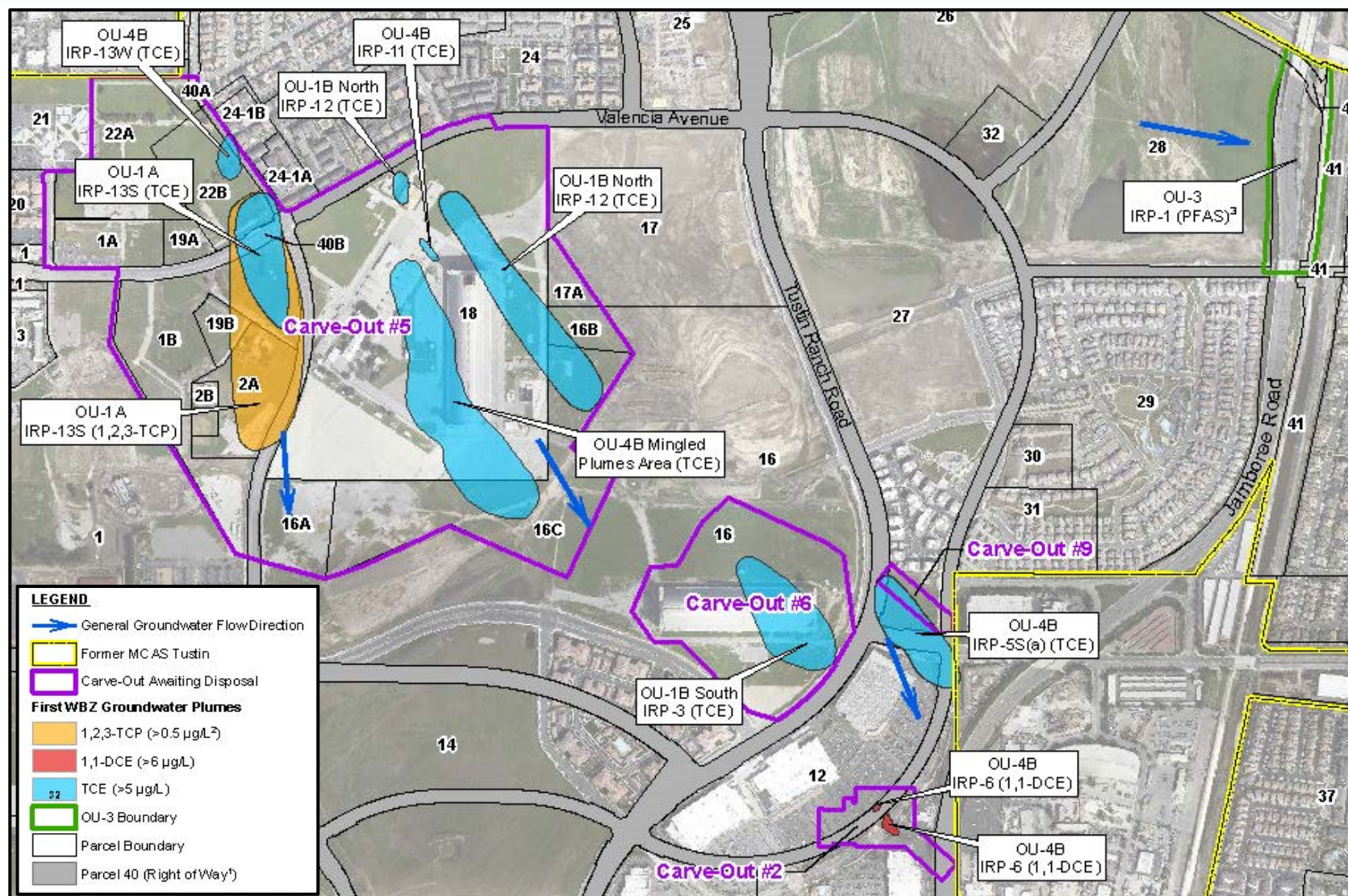
106th Restoration Advisory Board Meeting
19 April 2018

Presentation Overview

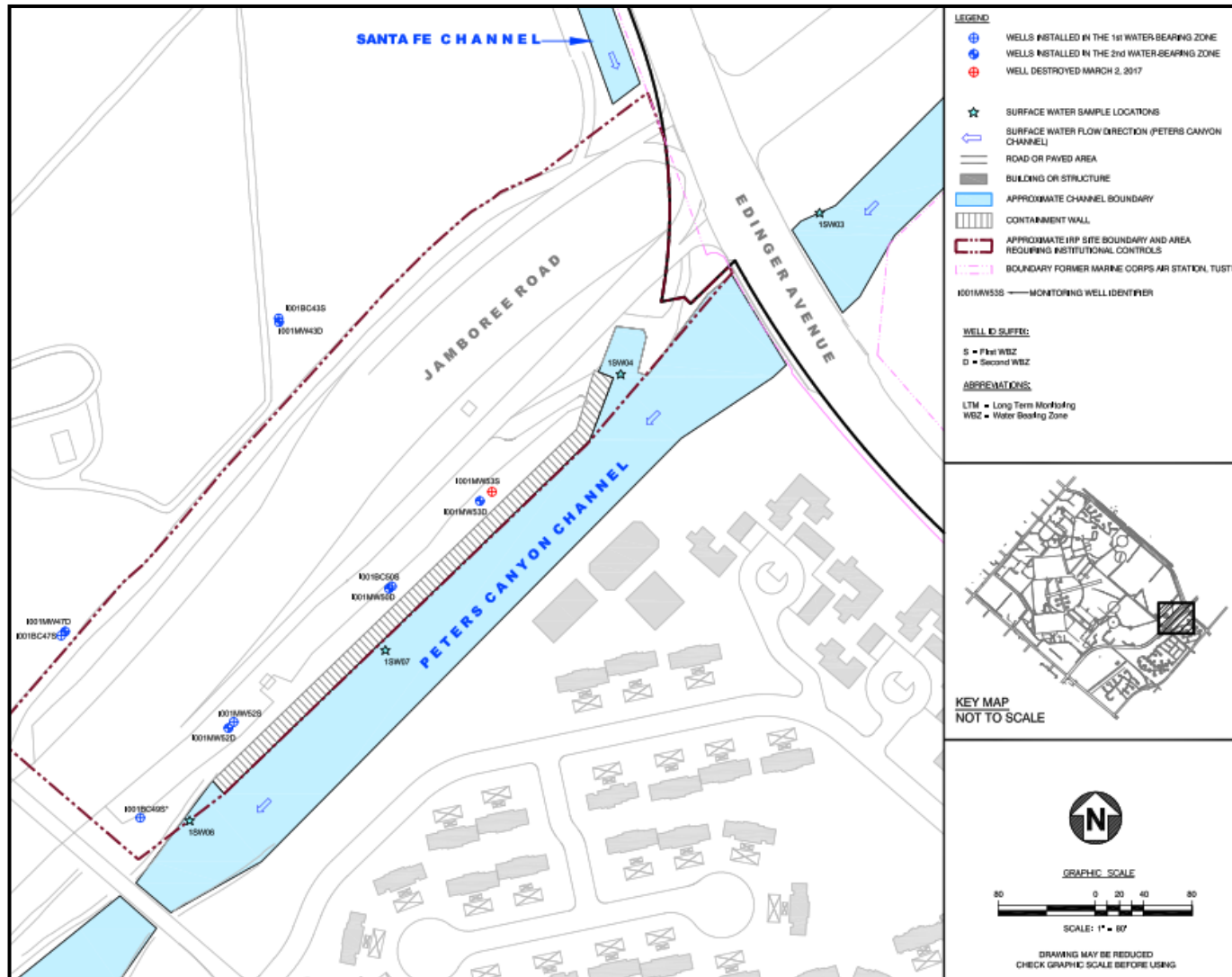


- **Operable Units (OUs) and Groundwater Plumes**
- **Groundwater Sampling for PFAS at OU-3/
Installation Restoration Program (IRP) Site 1**
 - Map
 - History
 - Conceptual Site Model
 - Technical Approach
 - Results
- **Groundwater Sampling for PFAS at OU-1A/1B North**
 - Map
 - Schedule

Operable Units and Groundwater Plumes



OU-3/IRP Site 1 Map

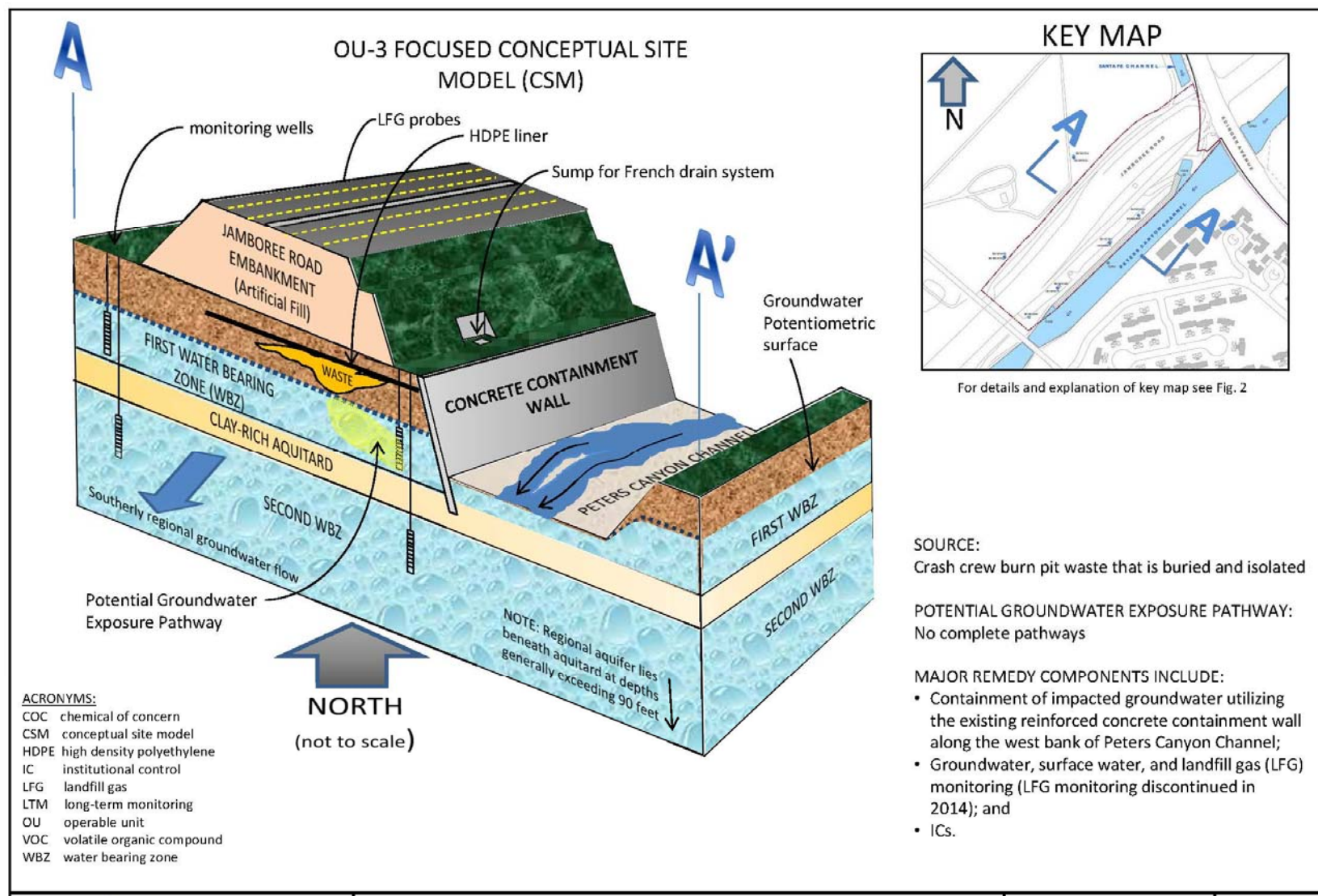


OU-3/IRP Site 1 History



- **Moffett Trenches and Crash Crew Burn Pits**
- **Trenches used from late 1940s/early 1950s until about 1971**
 - Approximately 5,000 cubic yards of material
- **Firefighting training exercises from 1971 to 1983**
- **Primary Chemicals of Concern in Groundwater**
 - Various volatile organic compounds
 - Various metals
- **Shallow groundwater is not used for drinking water**

OU-3/IRP Site 1 Conceptual Site Model



OU-3/IRP Site 1 Technical Approach



- **Assess PFAS presence/absence in vicinity of former Moffett Trenches and Crash Crew Burn Pits**

- **Focus on 3 compounds for which screening levels exist**

- perfluorooctanoic acid (PFOA)
 - perfluorooctanesulfonic acid (PFOS)
 - perfluorobutanesulfonic acid (PFBS)

- **Screening levels**

- PFOA, PFOS, and PFOA+PFOS = 0.07 microgram per liter (µg/L)
 - United States Environmental Protection Agency (U.S. EPA) Lifetime Health Advisory (May 2016)
 - PFBS = 400 µg/L
 - U.S. EPA Regional Screening Level (November 2017)

- **Regulatory concurrence obtained**

- **Two sampling events**

- July 2017 (3 wells in first water-bearing zone [WBZ])
 - November 2017 (9 wells in first and second WBZs)

OU-3/IRP Site 1

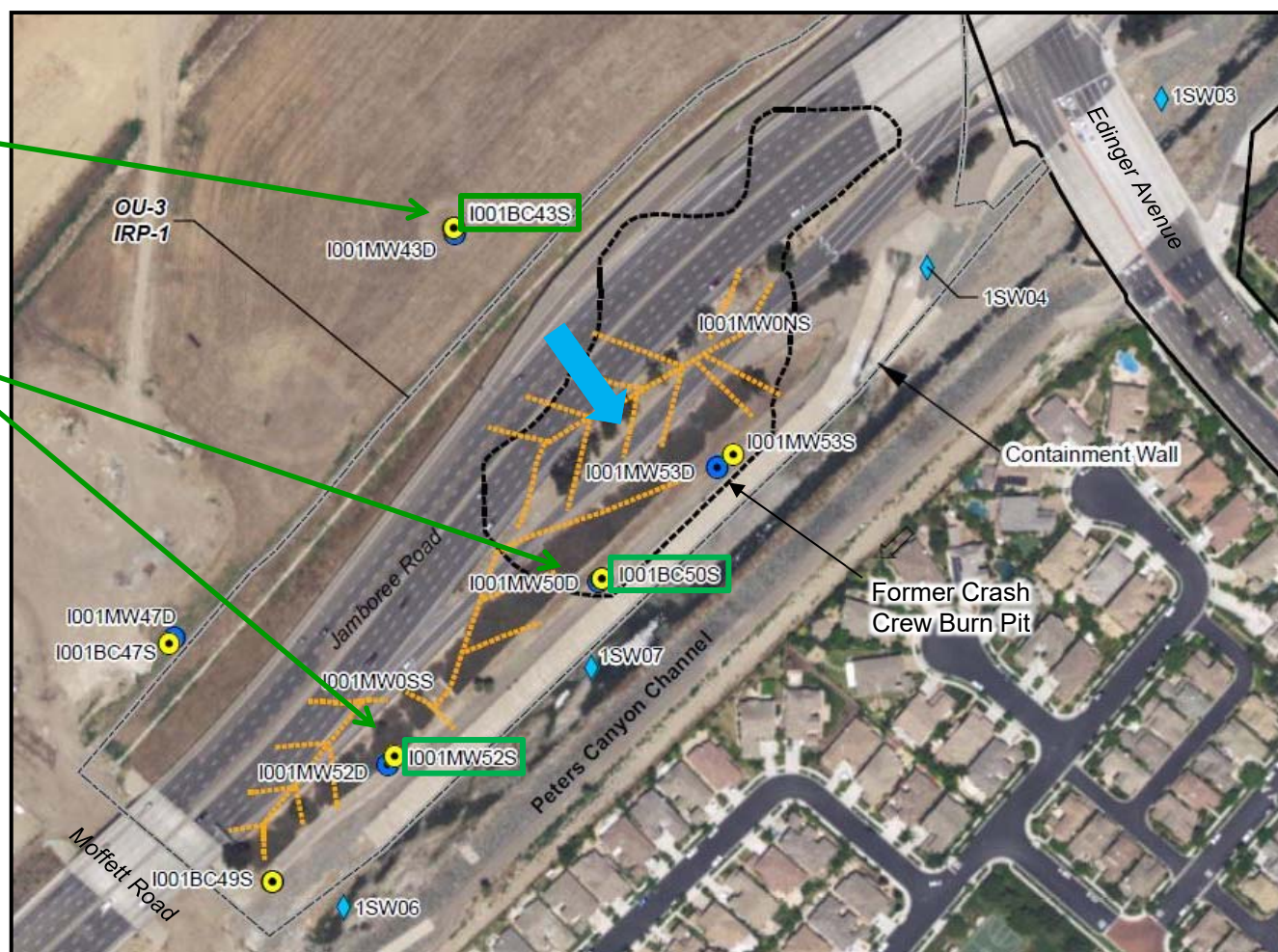
Wells Sampled in July 2017



- Well I001BC43S was selected to evaluate the presence or absence of PFAS upgradient of the former Crash Crew Burn Pit.
- Wells I001BC50S and I001MW52S were selected to evaluate the presence or absence of PFAS downgradient of the former Moffett Trenches and Crash Crew Burn Pits.

➔ Groundwater flow direction

□ Sampled well



OU-3/IRP Site 1

July 2017 Results



			PFOA	PFOS	PFOA+PFOS	PFBS
			µg/L	µg/L	µg/L	µg/L
U.S. EPA Lifetime Health Advisory ¹			0.07	0.07	0.07	-
U.S. EPA Tap Water Regional Screening Level ²			-	-	-	400
Well Identification	WBZ	Sample Date				
I001BC43S	First	7/24/2017	0.397	0.0263	0.423	0.0624
I001BC50S	First	7/24/2017	6.84	1.16	8.00	1.07
I001MW52S (duplicate)	First	7/24/2017	743 (637)	26.9 (18.1)	770 (655)	66.7 (61.7)

Notes:

1. PFOA, PFOS, and PFOA+PFOS screening levels are based on the U.S. EPA Lifetime Health Advisory for drinking water.
2. PFBS screening level is based on the U.S. EPA tap water Regional Screening Level.

Result exceeds U.S. EPA screening level

Bold = detection; µg/L = micrograms per liter; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; PFBS = perfluorobutanesulfonic acid; WBZ = water-bearing zone

OU-3/IRP Site 1

Wells Sampled in November 2017



9 of 10 existing wells sampled
4 in first WBZ
5 in second WBZ
1 well dry



→ Groundwater flow direction
□ Sampled well

OU-3/IRP Site 1


November 2017 Results



			PFOA	PFOS	PFOA+PFOS	PFBS
			µg/L	µg/L	µg/L	µg/L
U.S. EPA Lifetime Health Advisory ¹			0.07	0.07	0.07	-
U.S. EPA Tap Water Regional Screening Level ²			-	-	-	400
Well Identification	WBZ	Sample Date				
I001BC43S	First	11/15/2017	0.337	0.0490	0.386	0.0659
I001BC47S	First	11/15/2017	0.315	0.0391	0.354	0.0353
I001BC50S	First	11/14/2017	7.05 D	1.48	8.53	1.170
I001MW52S	First	11/13/2017	345	11.4	356	78.3
I001MW43D	Second	11/15/2017	0.00812 J	<0.00539	0.00812 J	0.00308 J
I001MW47D	Second	11/15/2017	0.00631 J	<0.00548	0.00631 J	0.00280 J
I001MW50D (duplicate)	Second	11/14/2017	0.00884 J (0.0101)	<0.00579 (0.00247 J)	0.00884 J (0.0125 J)	0.00292 J (0.0325)
I001BC52D	Second	11/14/2017	0.137	<0.00573	0.137	0.0325
I001MW53D	Second	11/14/2017	0.0575	<0.00517	0.0575	0.0115

Notes:

1. PFOA, PFOS, and PFOA+PFOS screening levels are based on the U.S. EPA Lifetime Health Advisory for drinking water.
2. PFBS screening level is based on the U.S. EPA tap water Regional Screening Level.

 = Result exceeds U.S. EPA screening level

Bold = detection; D = dilution; µg/L = micrograms per liter; PFOA = perfluorooctanoic acid; PFOS = perfluorooctane sulfonate; PFBS = perfluorobutanesulfonic acid; WBZ = water-bearing zone

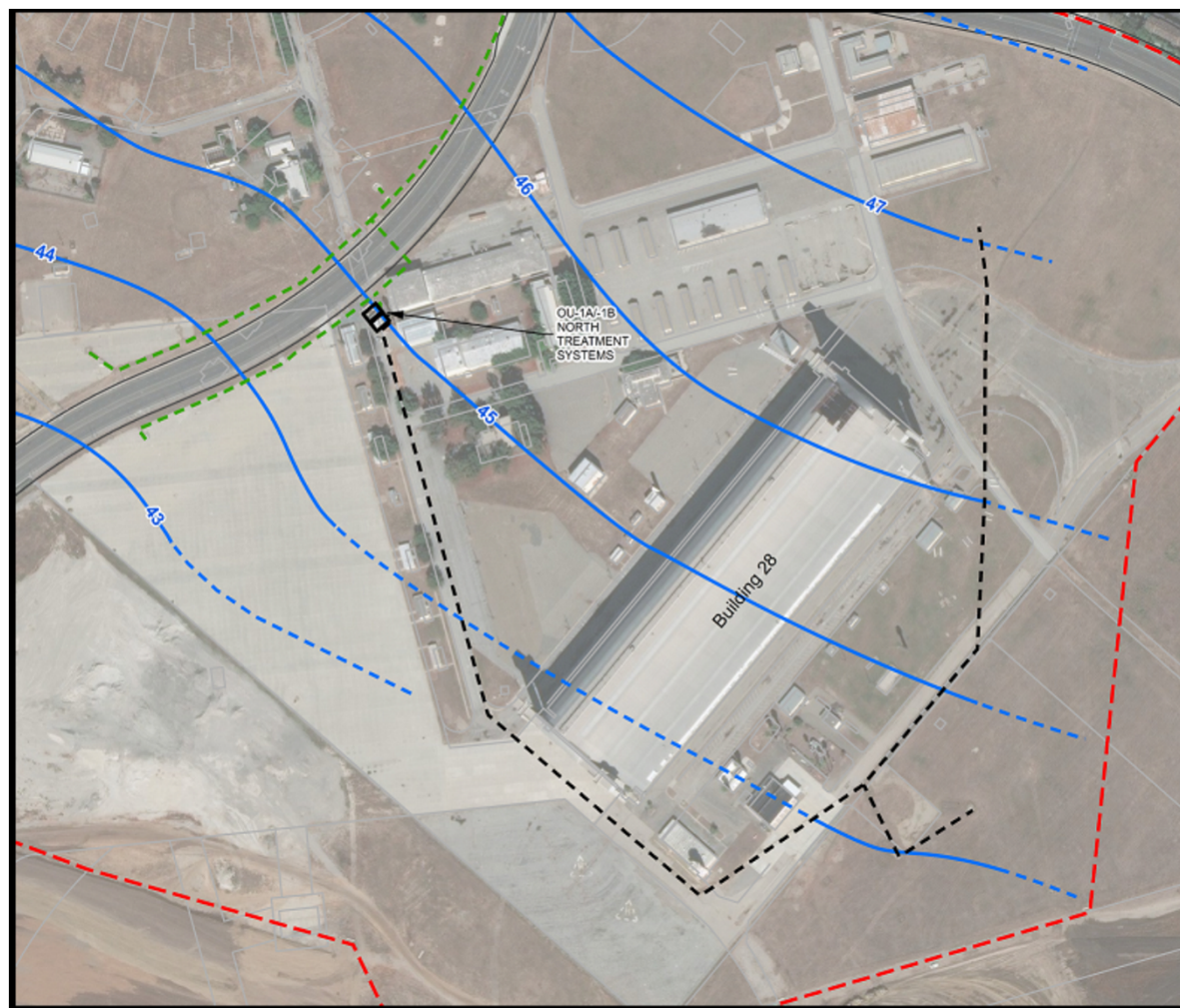
OU-1A/1B North Map



Groundwater Sampling for PFAS at OU-1A/1B North

Schedule

- Summer 2018



Acronyms



BRAC – Base Realignment
and Closure

IRP – Installation Restoration
Program

OU – Operable Unit

PFAS – per- and
polyfluoroalkyl substances

PFBS – perfluorobutanesulfonic
acid

PFOA – perfluorooctanoic acid

PFOS – perfluorooctane
sulfonate

U.S. EPA – United States
Environmental Protection
Agency

WBZ – water-bearing zone

µg/L – micrograms per liter

Questions

